GEORGIA INSTITUTE OF TECHNOLOGY — OFFICE OF CONTRACT ADMINISTRATION

PROJECT ADMINISTRATION DATA SHEET

[X] ORIGINAL [ ] REVISION NO. _____

Project No. E-18-801 (T5127-0A0) GTRC/~~GIT~~ DATE 7 / 1 / 86

Project Director: S.R. Stock ~~School~~/Lab Material E

Sponsor: McDonnell Douglas Electronics Company

Type Agreement: P.O. No. W2F516X

Award Period: From 2/27/86 To 12/31/86 (Performance) 12/31/86 (Reports)

Sponsor Amount:	This Change	Total to Date
Estimated:	$	$ 6,000
Funded:	$	$ 6,000

Cost Sharing Amount: $ N/A Cost Sharing No: N/A

Title: Rocking Curve Analysis

ADMINISTRATIVE DATA OCA Contact John Schonk X-4820

1) Sponsor Technical Contact:

2) Sponsor Admin/Contractual Matters:

Brenda Hawkins
McDonnell Douglas Electronics Company
Box 426
St. Charles, Missouri 63302
314/925-4688

Defense Priority Rating: N/A Military Security Classification: N/A

(or) Company/Industrial Proprietary: See T.C No. 11

RESTRICTIONS

See Attached N/A Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with N/A

COMMENTS:

COPIES TO:

SPONSOR'S I. D. NO. 02.212.000.86T361

Project Director
Research Administrative Network
Research Property Management
Accounting
Procurement/GTRI Supply Services
Research Security Services
Reports Coordinator (OCA)
Research Communications (2)
GTRC
Library
Project File
Other A. Jones

GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION/CLOSEOUT SHEET

3R669

Date 12/10/86

Project No. E18-801 School/~~Lab~~ ME

Includes Subproject No.(s) N/A

Project Director(s) S. R. Stock GTRC / ~~GIT~~

Sponsor McDonnell Douglas Electronics Company

Title Rocking Curve Analysis

Effective Completion Date: *12/31/86 (Performance) (Reports)

Grant/Contract Closeout Actions Remaining:

Fixed price. Accounting to check with P.I. for No. of samples.

* Terminate per John Schonk

- [ ] None
- [X] Final Invoice or Final Fiscal Report
- [ ] Closing Documents
- [ ] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other

Continues Project No. Continued by Project No.

COPIES TO:

Project Director
Research Administrative Network
Research Property Management
Accounting
Procurement/GTRI Supply Services
Research Security Services
Reports Coordinator (OCA)
Legal Services

Library
GTRC
Research Communications (2)
Project File
Other I. Lashley
A. Jones
R. Embry

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Georgia Institute of Technology
School of Materials Engineering
Atlanta, Georgia 30332-0245
(404) 894-

DOUBLE CRYSTAL ROCKING CURVE: Report 1

For: McDonnell Douglas Electronics Company

Specimen Identity: CdTe (111) II-VI # 8219
(CT2S-727)

Radiation: Copper K-alpha (25 kv, 7 ma)

Experimental Arrangement: (+,-)

Scan parameters: T. C. = 0.5, Scan Rate 8

Monochromator, Reflection: InSb (333)

Specimen, Reflection: CdTe (-3,-3,-3)

Experimental FWHM: 36 arc sec.

Comments: Presuming that this crystal is indeed high quality as-grown material, it is surprising that the rocking curve width is so great. The most probable cause is the glue used to mount the crystal onto a glass holder: large strains are the usual result of mounting material in this fashion. See Ch. 13 of Characterization of Crystal Growth Defects, Tanner and Bowen, eds., for a brief discussion of mounting methods. A second contribution could be from polishing damage if the crystal has not been chemically polished. The attached sheet is a photocopy of the experimentally measured rocking curves.

P. C. Huang and S. R. Stock

April 18, 1986

1st Xtal = $In_xSb_{(3-3)}$
2nd Xtal = CdTe (#8219)
Radiation = Kα (2mm beam size)
V & A = 25KV, 6.8 mA
Intensity : 130mm x 1X10^3

Light colored ink + thin lines make the duplication quite poor. SRS

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DOUBLE CRYSTAL ROCKING CURVE: Report 2

For: McDonnell Douglas Electronics Company

Specimen I.D.: CdTe (111) Eagle Picher #1031

Radiation: Copper K-alpha (24 kv, 5 ma)

Experimental Arrangement: (+,-)

Scan parameters: T. C. = 0.5, Scan Rate 8

Monochromator, Reflection: GaAs (004)

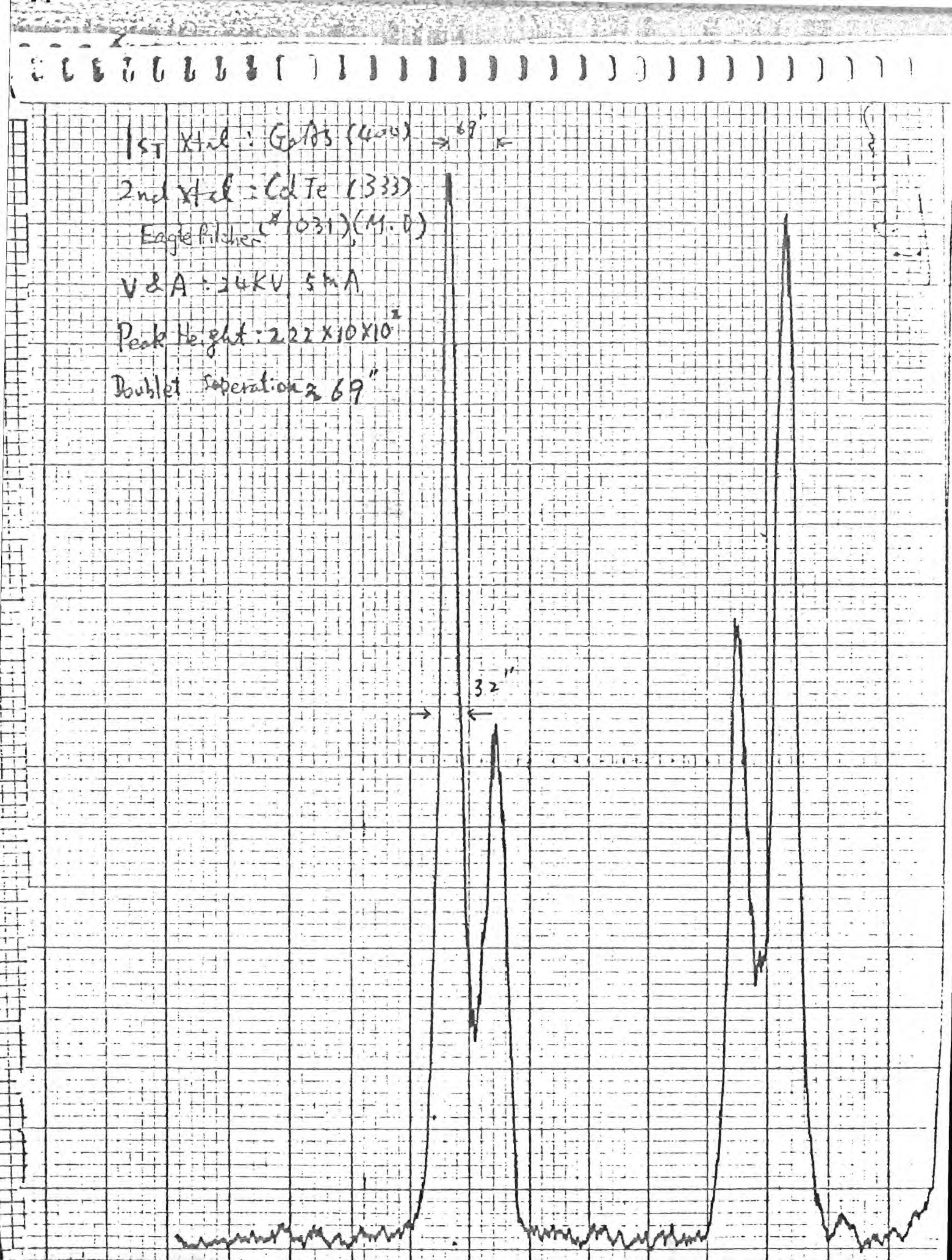
Specimen, Reflection: CdTe (-3,-3,-3)

Experimental FWHM: 32 arc sec.

Comments: This crystal has been glued onto the glass holder, and the resulting rocking curve width would be expected to be large. (see comments on Report 1) Note the difference in monochromator. Some dispersion broadening would be expected, but this is much smaller than the observed value. The attached sheet is a photocopy of the experimental curves.

P. C. Huang and S. R. Stock

April 18, 1986


1st Xtal : GaAs (400) → 69" ←
2nd Xtal : CdTe (333)
Eagle filter (Mo 031) (Mo-K)
V & A : 24KV 5mA
Peak Height : 2.2 × 10 × 10²
Doublet seperation = 69"
32"

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DOUBLE CRYSTAL ROCKING CURVE: Report 3

For: McDonnell Douglas Electronics Company

Specimen I.D.: CdZnTe (111) II-VI # 23765
(CT2S-880)

Radiation: Copper K-alpha (20 kv, 5 ma)

Experimental Arrangement: (+,-)

Scan parameters: T. C. = 0.5, Scan Rate 8

Monochromator, Reflection: InSb (333)

Specimen, Reflection: CdZnTe (-3,-3,-3)

Experimental FWHM: 14 arc sec.

Comments: This crystal has been glued onto the glass holder, but it appears that the resulting rocking curve width was not affected. The alternative is that the CdZnTe is considerably "better" than the CdTe. The attached sheet is a photocopy of the experimental curves.

P. C. Huang and S. R. Stock

April 18, 1986

In. Xtal : In Sb (333)

2nd Xtal : (d Zn Te (333), (# 23765)

Radiation : Kα (beam size : 2mm)

V & A : 20KV, 5mA

Intensity : 140mm × 10 × 10^2

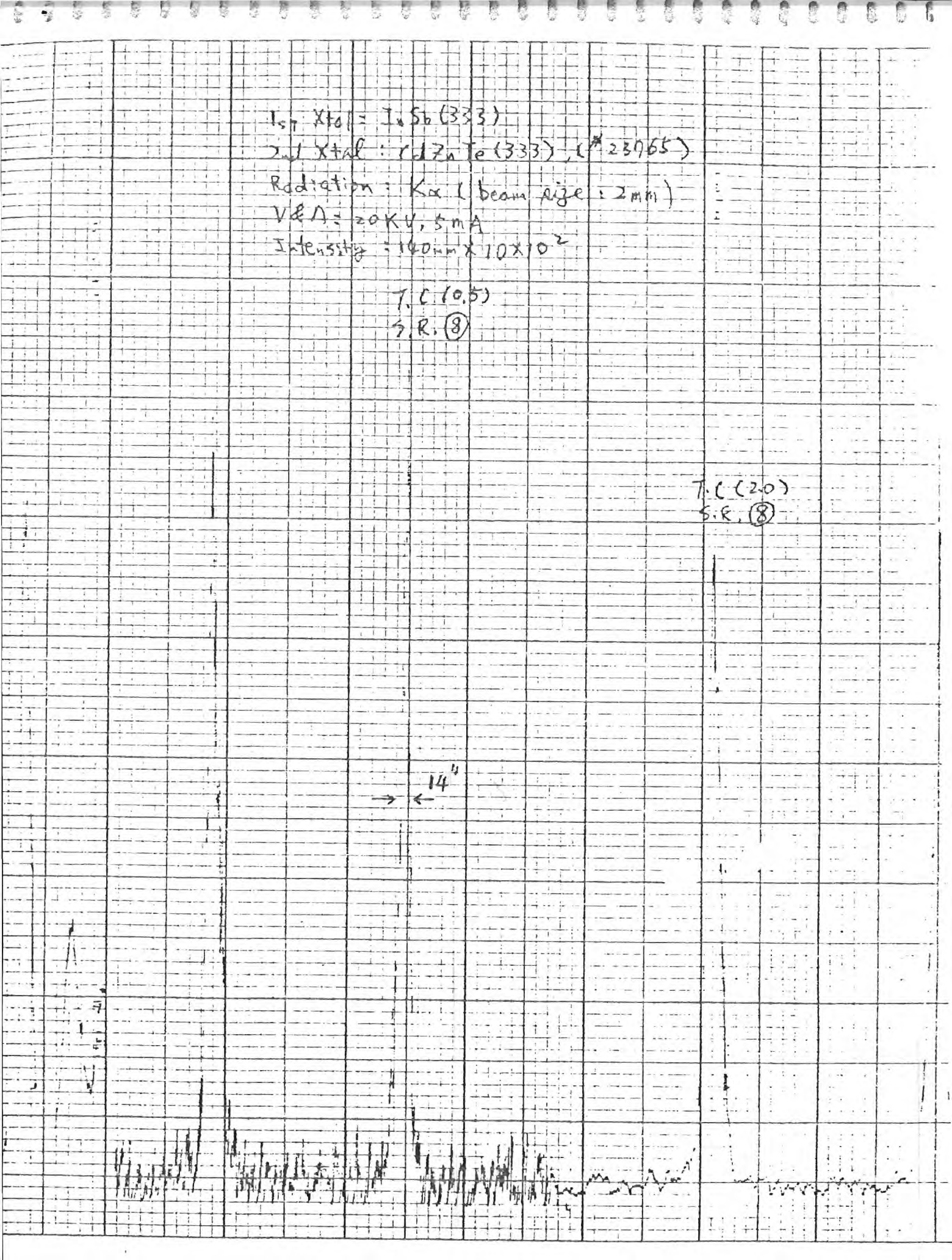
T.C (0.5)

S.R. (8)

T.C (2.0)

S.R. (8)

→ ← 14"



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DOUBLE CRYSTAL ROCKING CURVE: Report 4

For: McDonnell Douglas Electronics Company

Specimen I.D.: InSb (111) Crystal 1

Radiation: Copper K-alpha (20 kv, 5 ma)

Experimental Arrangement: (+,-)

Scan parameters: T. C. = 0.5, Scan Rate 8

Monochromator, Reflection: InSb (333) Crystal 2

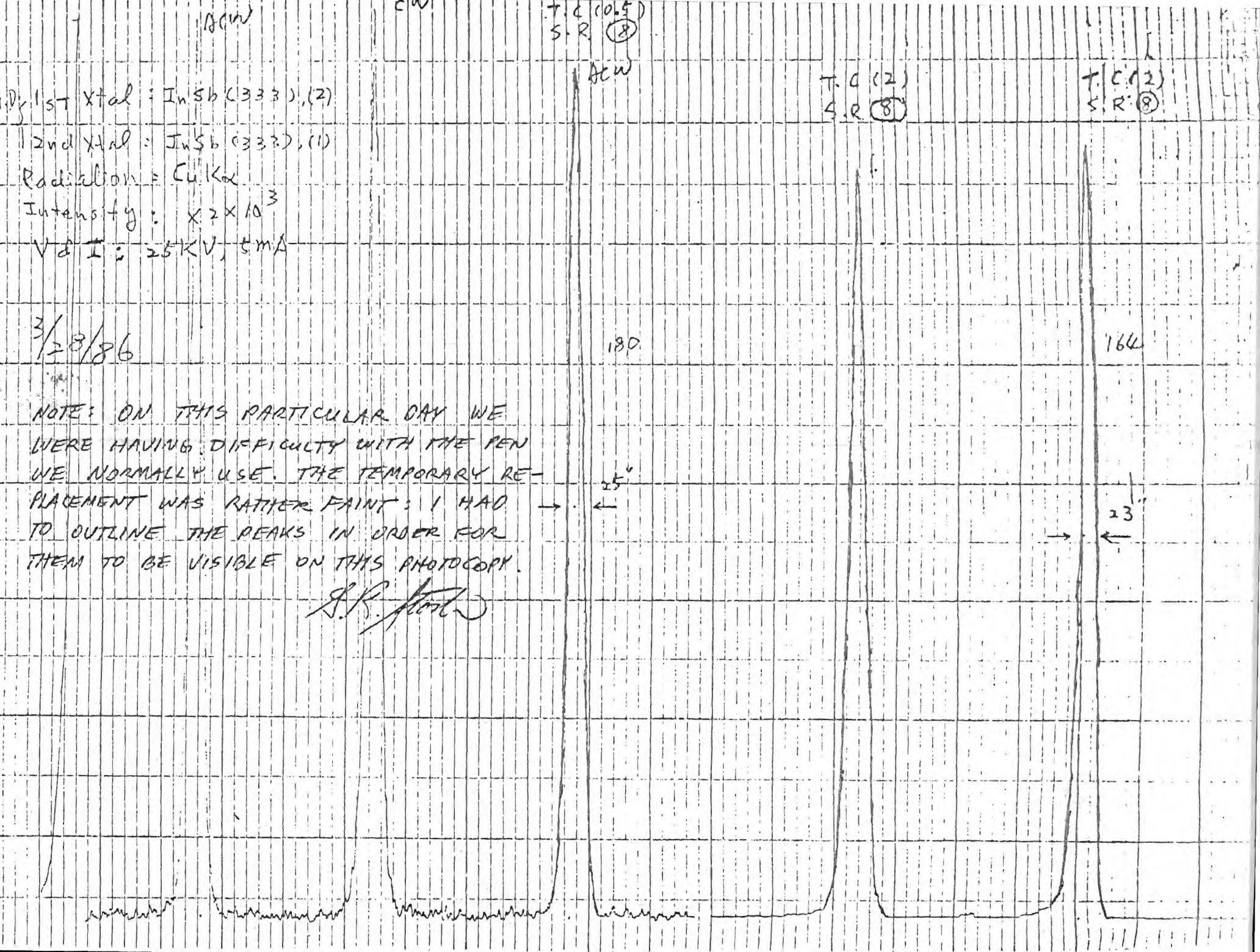
Specimen, Reflection: InSb (-3,-3,-3)

Experimental FWHM: 25 arc sec.

Comments: These crystals were received in an unmounted condition. They were carefully mounted with the only constraint being a small dab of soft wax in one corner. We would be surprised if any specimen deflection resulted. The difference with the expected values may be due to residual surface damage. The attached sheet is a photocopy of the experimental curves. I apologize for the copy quality: our pen was not working extremely well. The lines are distinct, however, on the originals.

P. C. Huang and S. R. Stock

April 18, 1986


1st Xtal : InSb (333), (2)
2nd Xtal : InSb (333), (1)
Radiation : Cu Kα
Intensity : X 2 x 10^3
V & I : 25 KV, 5 mA
3/28/86
NOTE: ON THIS PARTICULAR DAY WE WERE HAVING DIFFICULTY WITH THE PEN WE NORMALLY USE. THE TEMPORARY REPLACEMENT WAS RATHER FAINT: I HAD TO OUTLINE THE PEAKS IN ORDER FOR THEM TO BE VISIBLE ON THIS PHOTOCOPY.
T. C (10.5)
S. R (8)
T. C (2)
S. R (8)
T. C (2)
S. R (8)
180
25"
166
23"

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DOUBLE CRYSTAL ROCKING CURVE: Report 5

For: McDonnell Douglas Electronics Company

Specimen I.D.: InSb (111) Crystal 2

Radiation: Copper K-alpha (20 kv, 2 ma)

Experimental Arrangement: (+,-)

Scan parameters: T. C. = 0.5, Scan Rate 8

Monochromator, Reflection: InSb (333) Crystal 1

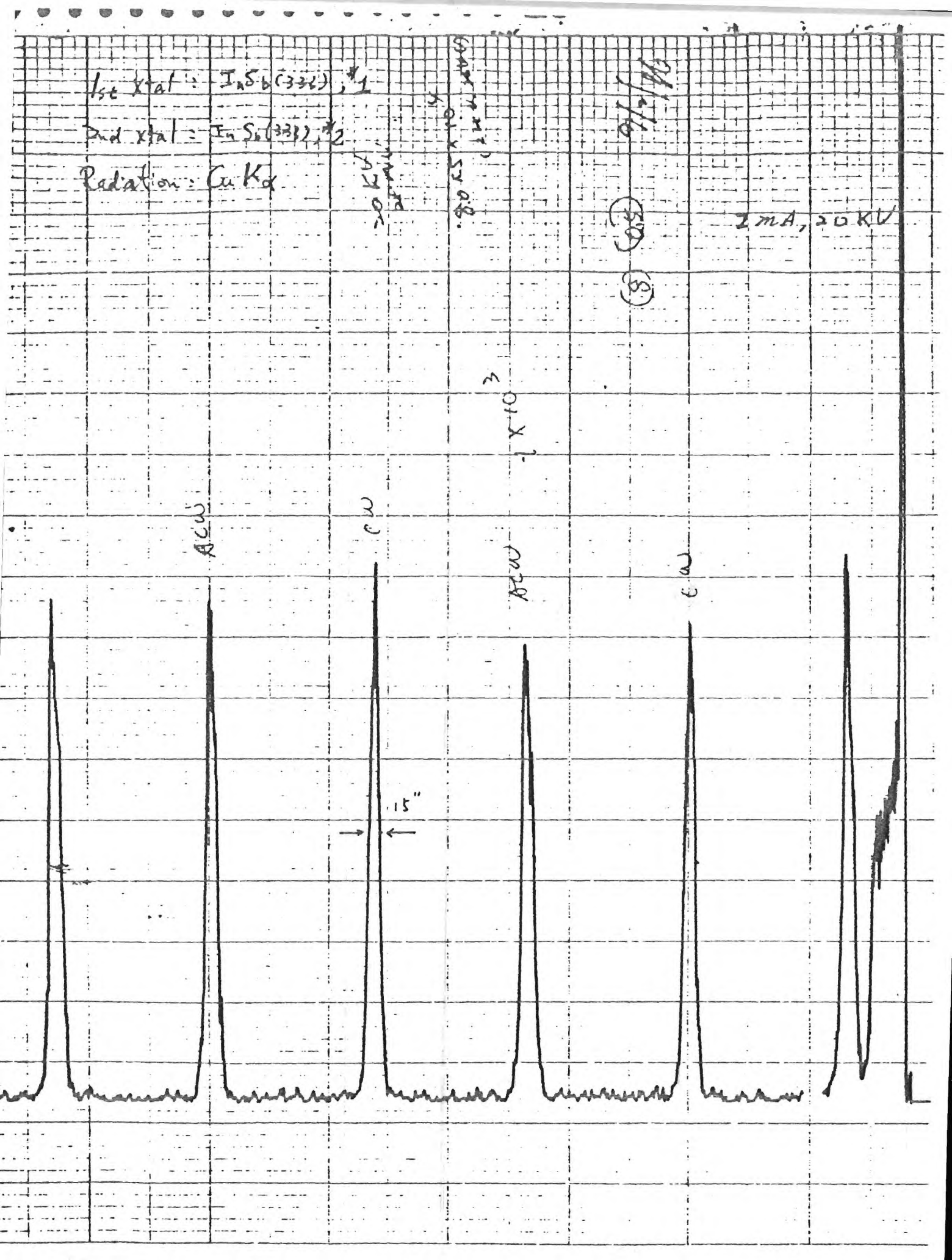
Specimen, Reflection: InSb (-3,-3,-3)

Experimental FWHM: 15 arc sec.

Comments: These crystals were received in an unmounted condition. They were carefully mounted with the only constraint being a small dab of soft wax in one corner. We would be surprised if significant specimen distortion resulted. One should note that this crystal has a significantly narrower FWHM than (111) InSb Crystal 1. The attached sheet is a photocopy of the experimental curves.

P. C. Huang and S. R. Stock

December 1, 1986
(test completed 9/3/86)


1st Xtal : InSb(332), #1
2nd xtal : InSb(332), #2
Radiation : Cu Kα
2mA, 20KV
ACW
CW
ACW
CW
15"

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DOUBLE CRYSTAL ROCKING CURVE: Report 5

For: McDonnell Douglas Electronics Company

Specimen I.D.: InSb (111) Crystal 2

Radiation: Copper K-alpha (20 kv, 2 ma)

Experimental Arrangement: (+,-)

Scan parameters: T. C. = 0.5, Scan Rate 8

Monochromator, Reflection: InSb (333) Crystal 1

Specimen, Reflection: InSb (-3,-3,-3)

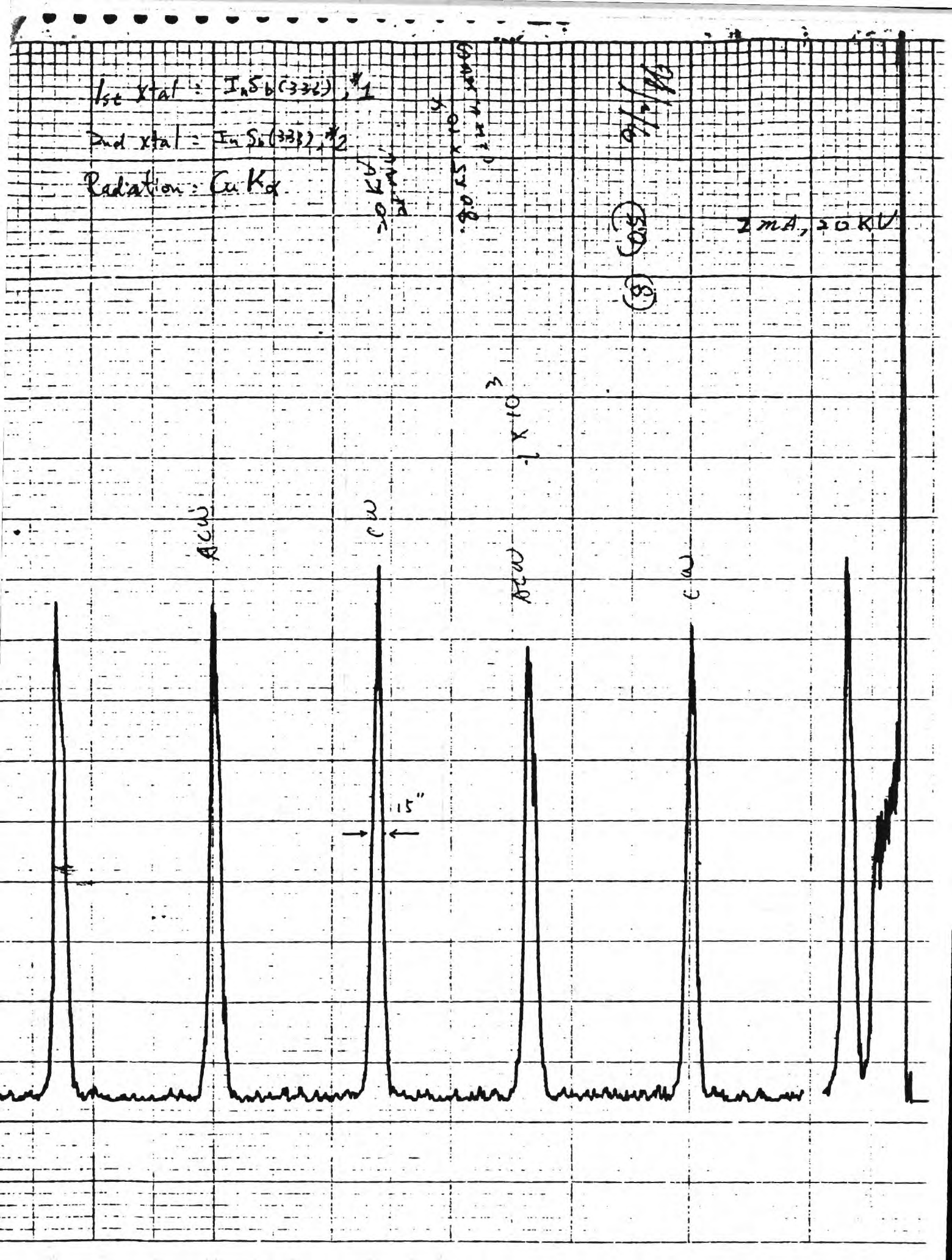
Experimental FWHM: 15 arc sec.

Comments: These crystals were received in an unmounted condition. They were carefully mounted with the only constraint being a small dab of soft wax in one corner. We would be surprised if significant specimen distortion resulted. One should note that this crystal has a significantly narrower FWHM than (111) InSb Crystal 1. The attached sheet is a photocopy of the experimental curves.

//

P. C. Huang and S. R. Stock

December 1, 1986
(test completed 9/3/86)


1st xtal : InSb (331), #1
2nd xtal = InSb (333), #2
Radiation: Cu Kα
2mA, 20KV
ACW
CW
ACW
CW
.15"